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52	9	((culling or cull or culled) and ((x or y) near3 sort$3)) and (345/$.ccls. or 382/$.ccls. or 348/$.ccls. or 463/$.ccls.)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/29 10:12
53	4	((culling or cull or culled) and ((horizontal or vertical) near3 sort$3)) and (345/$.ccls. or 382/$.ccls. or 348/$.ccls. or 463/$.ccls.)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/29 10:24
54	2	6304265.pn.	USPAT; US-PGPUB; DERWENT	2003/05/29 12:23
55	2	5898437.pn.	USPAT; US-PGPUB; DERWENT	2003/05/29 12:24
56	2	6529207.pn.	USPAT; US-PGPUB; DERWENT	2003/05/29 12:24
57	2	6437780.pn.	USPAT; US-PGPUB; DERWENT	2003/05/29 12:24
60	2	5748198.pn.	USPAT; US-PGPUB; DERWENT	2003/05/29 12:24
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-	51	(culling or cull or culled) and ("back-facing" or "back facing" or "backfacing") and (sort$3)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 12:46
-	2	5357600.pn.	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/21 13:02
-	2	5748198.pn.	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/21 13:02
-	1	(culling or cull or culled) and ("back-facing" or "back facing" or "backfacing") and ("cross product term" or "CPT")	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 12:46
-	300	345/421.ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/21 14:48

-	19	(culling or cull or culled) and ("cross product term" or "CPT")	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/21 13:07
-	1	("back-facing" or "back facing" or "backfacing") and ("CPT" or "cross product term")	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/21 13:09
-	0	345/421.ccls. and ("CPT" or "cross product term")	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 10:27
-	103	345/421.ccls. and (sort$3)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 10:27
-	2	345/421.ccls. and (vertex near3 (multiply or multiplied or multiplication))	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 10:27
-	5	345/421.ccls. and ((multiply or multiplied or multiplies or multiplication) near7 polygon)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 10:28
-	35	345/421.ccls. and ("dot product" or "dot-product")	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 10:28
-	544	345/420.ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 15:13
-	285	345/422.ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/21 15:12
-	99	345/422.ccls. and (sort$3)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/21 15:12
-	2	345/422.ccls. and (vertex near3 (multiply or multiplied or multiplication))	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/21 15:14
-	7	345/422.ccls. and ("dot product" or "dot-product")	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/21 15:18
-	4	345/420.ccls. and (vertex near3 (multiply or multiplied or multiplication))	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/21 15:17

-	597	345/619.ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/21 15:18
-	19	345/619.ccls. and ("dot product" or "dot-product")	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/21 15:23
-	17	345/619.ccls. and ("culling")	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 16:35
-	1	345/619.ccls. and (vertex near3 (multiply or multiplied or multiplication))	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/22 11:39
-	2	"20030006993"	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/22 11:39
-	301	345/421.ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 12:21
-	0	345/421.ccls. and ("CPT" or "cross product term")	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 10:28
-	104	345/421.ccls. and (sort$3)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 10:28
-	2	345/421.ccls. and (vertex near3 (multiply or multiplied or multiplication))	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 10:28
-	5	345/421.ccls. and ((multiply or multiplied or multiplies or multiplication) near7 polygon)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 10:28
-	35	345/421.ccls. and ("dot product" or "dot-product")	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 10:28
-	177	345/421.ccls. not ((345/421.ccls. and ("CPT" or "cross product term")) or (345/421.ccls. and (sort$3)) or (345/421.ccls. and (vertex near3 (multiply or multiplied or multiplication))) or (345/421.ccls. and ((multiply or multiplied or multiplies or multiplication) near7 polygon)) or (345/421.ccls. and ("dot product" or "dot-product")))	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 10:29

-	52	345/421.ccls. and cull$3	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 12:22
-	722	382/154.ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 12:56
-	341	(culling or cull or culled) and ("back-facing" or "back facing" or "backfacing" or "backface" or "back face" or "occlusion" or "visibility") and (sort$3)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 12:58
-	2	(culling or cull or culled) and ("back-facing" or "back facing" or "backfacing" or "occlusion" or "visibility") and ("cross product term" or "CPT")	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 12:58
-	14	((culling or cull or culled) and ("back-facing" or "back facing" or "backfacing" or "backface" or "back face" or "occlusion" or "visibility") and (sort$3)) not ((culling or cull or culled) and ("back-facing" or "back facing" or "backfacing" or "occlusion" or "visibility") and (sort$3))	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 12:59
-	2	382/154.ccls. and (cull$3 near7 sort$3)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 13:01
-	327	(culling or cull or culled) and ("back-facing" or "back facing" or "backfacing" or "occlusion" or "visibility") and (sort$3)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 13:32
-	2	382/154.ccls. and (cull$3 near7 ("backfacing" or "back face" or "backface" or "visibility" or "occlusion"))	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 13:04
-	139	((culling or cull or culled) and ("back-facing" or "back facing" or "backfacing" or "occlusion" or "visibility") and (sort$3)) and (345/$.ccls. or 382/$.ccls. or 348/$.ccls. or 463/$.ccls.)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/29 10:04
-	103	345/606.ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 16:17
-	16	(US-5977980-$ or US-6542152-$ or US-6507341-$ or US-6489955-$ or US-6266064-$ or US-6172679-$ or US-5914721-$ or US-5903272-$ or US-5898437-$ or US-6529207-$ or US-RE38078-$ or US-6518965-$ or US-5748198-$ or US-5357600-$ or US-6346939-$ or US-6456284-$).did.	USPAT	2003/05/27 15:23

-	10	((US-5977980-$ or US-6542152-$ or US-6507341-$ or US-6489955-$ or US-6266064-$ or US-6172679-$ or US-5914721-$ or US-5903272-$ or US-5898437-$ or US-6529207-$ or US-RE38078-$ or US-6518965-$ or US-5748198-$ or US-5357600-$ or US-6346939-$ or US-6456284-$).did.) and (sort$3)	USPAT; US-PGPUB; DERWENT	2003/05/27 15:23
-	4	345/606.ccls. and cull$3	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 16:23
-	42	("cross product" or "cross-product") near7 (vertex or vertices)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 16:25
-	67	345/419.ccls. and ("culling" or "cull" or "culled")	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/05/27 16:35
-	2	6304265.pn.	USPAT; US-PGPUB; DERWENT	2003/05/28 08:10

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1 **Hierarchical back-face culling for collision detection**
Redon, S.; Kheddar, A.; Coquillart, S.;
Intelligent Robots and System, 2002. IEEE/RSJ International Conference on , V
3 , 2002
Page(s): 3036 -3041 vol.3

[Abstract] [PDF Full-Text (482 KB)] **IEEE CNF**

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2 **Backface culling snags [rendering algorithm]**
Blinn, J.F.;
Computer Graphics and Applications, IEEE , Volume: 13 Issue: 6 , Nov 1993
Page(s): 94 -97

[Abstract] [PDF Full-Text (260 KB)] **IEEE JNL**

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1 Fast backface culling using normal masks 96%
Hansong Zhang , Kenneth E. Hoff
Proceedings of the 1997 symposium on Interactive 3D graphics April 1997

2 QSplat: a multiresolution point rendering system for large meshes 91%
Szymon Rusinkiewicz , Marc Levoy
Proceedings of the 27th annual conference on Computer graphics and interactive techniques July 2000

Advances in 3D scanning technologies have enabled the practical creation of meshes with hundreds of millions of polygons. Traditional algorithms for display, simplification, and progressive transmission of meshes are impractical for data sets of this size. We describe a system for representing and progressively displaying these meshes that combines a multiresolution hierarchy based on bounding spheres with a rendering system based on points. A single data structure is used for view frustum ...

3 Efficient perspective-accurate silhouette computation and applications 88%
Mihai Pop , Christian Duncan , Gill Barequet , Michael Goodrich , Wenjing Huang , Subodh Kumar
Proceedings of the seventeenth annual symposium on Computational geometry June 2001

Silhouettes are perceptually and geometrically salient features of geo metric models. Hence a number of graphics and visualization applications need to find them to aid further processing. The efficient computation of silhouettes, especially in the context of perspective projection, is known to be difficult. This paper presents a novel efficient and practical algorithm to compute silhouettes from a sequence of viewpoints under perspective projection. Parallel projection is a special case ...

4 Spatialized normal come hierarchies 88%
David E. Johnson , Elaine Cohen
Proceedings of the 2001 symposium on Interactive 3D graphics March 2001

5 Polygon rendering on a stream architecture 87%
John D. Owens , William J. Dally , Ujval J. Kapasi , Scott Rixner , Peter Mattson , Ben Mowery
Proceedings 2000 SIGGRAPH/EUROGRAPHICS workshop on on Graphics hardware August 2000

The use of a programmable stream architecture in polygon rendering provides a powerful mechanism to address the high performance needs of today's complex scenes as well as the need for flexibility and programmability in the polygon rendering pipeline. We describe how a polygon rendering pipeline maps into data streams and kernels that operate on streams, and how this mapping is used to implement the polgyon rendering pipeline on Imagine, a programmable stream processor. We compare our resul ...

6 Silhouette clipping 87%
Pedro V. Sander , Xianfeng Gu , Steven J. Gortler , Hugues Hoppe , John Snyder
Proceedings of the 27th annual conference on Computer graphics and interactive techniques July 2000

Approximating detailed with coarse, texture-mapped meshes results in polygonal silhouettes. To eliminate this artifact, we introduce silhouette clipping, a framework for efficiently clipping the rendering of coarse geometry to the exact silhouette of the original model. The coarse mesh is obtained using progressive hulls, a novel representation with the nesting property required for proper clipping. We describe an improved technique for constructing texture and normal maps over this coarse ...

7 Fast ray tracing by ray classification 85%
James Arvo , David Kirk
ACM SIGGRAPH Computer Graphics , Proceedings of the 14th annual conference on Computer graphics and interactive techniques August 1987
Volume 21 Issue 4

8 Session P1: point-based rendering and modeling: POP: a hybrid point and polygon rendering system for large data 84%
Baoquan Chen , Minh Xuan Nguyen
Proceedings of the conference on Visualization 2001 October 2001

We introduce a simple but effective extension to the existing pure point rendering systems. Rather than using only points, we use both points and polygons to represent and render large mesh models. We start from triangles as leaf nodes and build up a hierarchical tree structure with intermediate nodes as points. During the rendering, the system determines whether to use a point (of a certain intermediate level node) or a triangle (of a leaf node) for display depending on the screen contribution ...

9 Fast approximate visible set determination for point sample clouds 82%
Stephan Mantler , Anton L. Fuhrmann
Proceedings of the workshop on Virtual environments 2003 May 2003

We present a fast, efficient method to determine approximate visible sets for vegetation rendered as point sample clouds. A hardware accelerated preprocessing step is used to determine exact visibility for a selected set of views; at runtime the current view is rendered using an approximate visible set constructed from the three

closest precalculated views. We will further demonstrate how this method leads to a significant per-frame reduction of the original data size.

10 Adaptive view dependent tessellation of displacement maps 82%
Michael Doggett , Johannes Hirche
Proceedings 2000 SIGGRAPH/EUROGRAPHICS workshop on on Graphics hardware August 2000
Displacement Mapping is an effective technique for encoding the high levels of detail found in today's triangle based surface models. Extending the hardware rendering pipeline to be capable of handling displacement maps as geometric primitives, will allow highly detailed models to be constructed without requiring large numbers of triangles to be passed from the CPU to the graphics pipeline. We present a new approach based on recursive tessellation that adapts to the surface complexity descr ...

11 The out of box experience: lessons learned creating compelling VRML 2.0 content 82%
Sam Chen , Rob Myers , Rick Pasetto
Proceedings of the second symposium on Virtual reality modeling language February 1997

12 Parallel graphics and interactivity with the scaleable graphics engine 80%
Kenneth A. Perrine , Donald R. Jones
Proceedings of the 2001 ACM/IEEE conference on Supercomputing (CDROM) November 2001
A parallel rendering environment is being developed to utilize the IBM Scaleable Graphics Engine (SGE), a hardware frame buffer for parallel computers. Goals of this software development effort include finding efficient ways of producing and displaying graphics generated on IBM SP nodes and of assisting programmers in adapting or creating scientific simulation applications to use the SGE. Four software development phases discussed utilize the SGE: tunneling, SMP rendering, development of an Open ...

13 Point-based rendering: Efficient high quality rendering of point sampled geometry 80%
Mario Botsch , Andreas Wiratanaya , Leif Kobbelt
Proceedings of the 13th workshop on Rendering July 2002
We propose a highly efficient hierarchical representation for point sampled geometry that automatically balances sampling density and point coordinate quantization. The representation is very compact with a memory consumption of far less than *2* bits per point position which does not depend on the quantization precision. We present an efficient rendering algorithm that exploits the hierarchical structure of the representation to perform fast 3D transformations and shading. The algorithm is ...

14 Session D: Virtual environments software: Image caching algorithms and strategies for real time rendering of complex virtual environments 80%
Marcello Carrozzino , Franco Tecchia , Claudia Falcioni , Massimo Bergamasco
Proceedings of the 1st international conference on Computer graphics, virtual reality and visualisation November 2001
This paper presents a study about the comparison of several methods of image cache management; image caching is a recent approach of rendering, based on the concepts of impostors and hierarchical scene subdivision, which exploits the

coherence of consecutive frames in a graphic sequence. Anyway existent methods don't exploit the aspects in common with cache memory management; therefore they organize the image cache without using an optimal strategy.An implementation with variable factors and str ...

15 The randomized z-buffer algorithm: interactive rendering of highly complex scenes 80%

Michael Wand , Matthias Fischer , Ingmar Peter , Friedhelm Meyer auf der Heide , Wolfgang Straßer

Proceedings of the 28th annual conference on Computer graphics and interactive techniques August 2001

We present a new output-sensitive rendering algorithm, the *randomized z-buffer algorithm*. It renders an image of an arbitrary three-dimensional scene consisting of triangular primitives by reconstruction from a dynamically chosen set of random surface sample points. This approach is independent of mesh connectivity and topology. The resulting rendering time grows only logarithmically with the numbers of triangles in the scene. We were able to render walkthroughs of scenes of up to 10

16 Displaced subdivision surfaces 80%

Aaron Lee , Henry Moreton , Hugues Hoppe

Proceedings of the 27th annual conference on Computer graphics and interactive techniques July 2000

In this paper we introduce a new surface representing, the displaced subdivision surface. It represents a detailed surface model as a scalar-valued displacement over a smooth domain surface. Our representation defines both the domain surface and the displacement function using a unified subdivision framework, allowing for simple and efficient evaluation of analytic surface properties. We present a simple, automatic scheme for converting detailed geometric models into such a ...

17 Rendering on a budget: a framework for time-critical rendering 80%

James T. Klosowski , Cláudio T. Silva

Proceedings of the conference on Visualization '99: celebrating ten years October 1999

We present a technique for optimizing the rendering of highdepth complexity scenes. Prioritized-Layered Projection (PLP) does this by rendering an estimation of the visible set for each frame. The novelty in our work lies in the fact that we do not explicitly compute visible sets. Instead, our work is based on computing on demand a priority order for the polygons that maximizes the likelihood of rendering visible polygons before occluded ones for any given ...

18 Multiple viewpoint rendering 80%

Michael Halle

Proceedings of the 25th annual conference on Computer graphics and interactive techniques July 1998

19 zLayer: simulating depth with extended parallax scrolling 80%

Desmond Hii

Proceedings of the ACM symposium on Virtual reality software and technology September 1997

20 Fast data parallel polygon rendering 80%
F. A. Ortega , C. D. Hansen , J. P. Ahrens
Proceedings of the 1993 ACM/IEEE conference on Supercomputing December 1993

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